Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the present application:

Listing of Claims

1. (Previously presented) The process for forming a filtration module having at least one feed inlet

port, at least one permeate port and at least one retentate port which comprises:

providing a plurality of fluid permeable filtrate spacer layers and a plurality of membrane filter layers,

molding a thermoplastic polymeric sealing composition about the periphery of each of the plurality of fluid permeable filtrate spacer layers and around a port selected from the group consisting of at least one the feed inlet port, at least one permeate port and at least one retentate port, in a pattern which effects desired fluid flow through the layers,

forming a stack of the plurality of fluid permeable filtrate spacer layers and the plurality of membrane filter layers wherein said spacer layers are positioned alternately with said filter layers in a vertical direction, and

heating the thermoplastic composition of each filtrate spacer layer so as to seal alternately positioned spacer layers in a port such that liquid in said at least one permeate port is not admixed with liquid in said feed inlet port and to bond the filtrate spacer layers and membrane layers together in a liquid tight arrangement and wherein the module has a packing density of active membrane to external filter volume of at least 300 m^2/m^3.

2. (Canceled)

3. (Canceled)

4. (Previously presented) The of Claim 1 further comprising a plurality of feed screens wherein each of said feed screens include a thermoplastic elastomer formed about the periphery of said feed screen and wherein said thermoplastic elastomer is between about 100% and about 125% the thickness of said feed screen and the feed screen layers are alternated with a composite layer comprising a filtrate space layer bonded to two membrane layers.

5. (Previously presented) The process of claim 1 wherein the heating is in a form selected from the group consisting of radiant heat, ultrasonic energy and vibration welding.

6. (Previously presented) The process of claim 1 wherein the thermoplastic polymer composition is molded in a pattern which effects desired fluid flow through the layers.

7. (Previously presented) The process for forming a normal flow filtration module having at least one feed inlet port and at least one permeate port which comprises:

providing a plurality of fluid permeable filtrate spacer layers and a plurality of membrane filter layers,

molding a thermoplastic polymeric sealing composition about the periphery of each of the plurality of fluid permeable filtrate spacer layers and around a port selected from the group consisting of at least one the feed inlet port and at least one permeate port, in a pattern which effects desired fluid flow through the layers,

forming a stack of the plurality of fluid permeable filtrate spacer layers and the plurality of membrane filter layers wherein said spacer layers are positioned alternately with said filter layers in a vertical direction, and

heating the thermoplastic composition of each filtrate spacer layer so as to seal alternately positioned spacer layers in a port such that liquid in said at least one permeate port is not admixed with liquid in said at least one feed port and to bond the filtrate spacer layers and membrane layers together in a liquid tight arrangement and wherein the module has a packing density of active membrane to external filter volume of at least 300 m^2/m^3.

8. (Previously presented) The of Claim 1 further comprising a plurality of feed screens wherein each of said feed screens include a thermoplastic elastomer formed about the periphery of said feed screen and wherein said thermoplastic elastomer is between about 100% and about 125% the thickness of said feed screen and feed spacer layers are alternated with a composite layer comprising a filtrate space layer bonded to two membrane layers.

9. (Previously presented) The process of claim 1 further comprising forming an outer portion of the module surrounding the stack by a process selected from the group consisting of insert molding of a thermoplastic material and potting of a thermoset material.

10. (Previously presented) The process of claim 7 further comprising forming an outer portion of the module surrounding the stack by a process selected from the group consisting of insert molding of a thermoplastic material and potting of a thermoset material.

11. (Previously presented) The process of claim 1 further comprising forming an outer portion of the module surrounding the stack by a process of insert molding of a thermoplastic material.

12. (Previously presented) The process of claim 7 further comprising forming an outer portion of the module surrounding the stack by a process of insert molding of a thermoplastic material.

13. (Previously presented) The process for forming a filtration module having at least one feed inlet port and at least one permeate port which comprises:

providing a plurality of fluid permeable spacer layers,

forming thermoplastic sections to said spacer layers about the periphery of each of the fluid permeable filtrate spacer layers and around a port selected from the group consisting of at least one inlet feed port and at least one permeate port in a pattern which effects desired fluid flow through the layers,

forming a stack of a plurality of the fluid permeable spacer layers and a plurality of membrane filter layers wherein the spacer layers are positioned alternately with the filter layers in a vertical direction;

melting the thermoplastic sections to selectively seal the spacer layers in the at least one feed inlet port and the at least one permeate port such that liquid in the at least one permeate port is not admixed with liquid in the at least one feed port, and to bond the membrane layers to the adjacent spacer layers,

forming an outer portion surrounding the stack by a process selected from the group consisting of insert molding of a thermoplastic material and potting of a thermoset material.

14. (Previously presented) The process of claim 13 wherein the spacer layers are filtrate spacer layers.

15. (Previously presented) The process of claim 13 wherein the spacer layers are feed and filtrate spacer layers.

16. (Previously presented) The process of claim 13 wherein the spacer layers having the thermoplastic sections are filtrate spacer layers and further comprising a plurality of feed spacer

layers, wherein a compressible polymer composition is formed on selected sections of the feed spacer layers before assembly into the stack and are compressed during assembly to form a liquid tight seal.

17. (Previously presented) The process of claim 13 further comprising at least one retentate port.

18. (Previously presented) The process of claim 13 wherein the outer portion is formed by insert molding of a thermoplastic material.

19. (Previously presented) The process of claim 13 wherein the outer portion is formed by potting of thermoset material.

20. (Previously presented) The process for forming a filtration module having at least one feed inlet port, at least one permeate port and at least one retentate port which comprises:

providing a plurality of fluid permeable spacer layers,

forming thermoplastic sections to said spacer layers about the periphery of each of the plurality of fluid permeable filtrate spacer layers and around a port selected from the group consisting of at least one inlet feed port, at least one permeate port and at least one retentate port in a pattern which effects desired fluid flow through the layers,

forming a stack of a plurality of the fluid permeable spacer layers and a plurality of membrane filter layers wherein the spacer layers are positioned alternately with the filter layers in a vertical direction;

melting the thermoplastic sections to selectively seal the spacer layers in the at least one feed inlet port, the at least one permeate port and at least one retentate port such that liquid in said at least one permeate port is not admixed with liquid in the at least one feed port and in the at least one retentate port and to bond the membrane layers to the adjacent spacer layers, and

forming an outer portion of the module surrounding the stack by a process selected from the group consisting of insert molding of a thermoplastic material and potting of a thermoset material.

21. (Previously presented) The process for forming a filtration module having at least one feed inlet port, at least one permeate port and at least one retentate port which comprises:

providing a plurality of fluid permeable filtrate spacer layers,

forming thermoplastic sections to the filtrate spacer layers about the periphery of each of the plurality of fluid permeable filtrate spacer layers and around a port selected from the group consisting of at least one inlet feed port, at least one permeate port and at least one retentate port in a pattern which effects desired fluid flow through the layers,,

providing a plurality of feed spacer layers,

forming a compressible polymeric composition to the feed spacer layers

forming a stack of alternately positioned plurality of the feed permeable spacer layers, a plurality of filtrate spacer layers and a plurality of membrane filter layers;

compressing the stack,

melting the thermoplastic sections of the filtrate spacer layers while under compression to selectively seal the spacer layers in the at least one feed inlet port, the at least one permeate port and at least one retentate port such that liquid in said at least one permeate port is not admixed with liquid in the at least one feed port and in the at least one retentate port and to bond the membrane layers to the adjacent spacer layers, and

forming an outer portion of the module surrounding the stack by a process selected from the group consisting of insert molding of a thermoplastic material and potting of a thermoset material.

22. (Previously presented) The process for forming a filtration module having at least one feed inlet port, and at least one permeate port which comprises:

providing a plurality of fluid permeable filtrate spacer layers,

forming thermoplastic sections to the filtrate spacer layers about the periphery of each of the plurality of fluid permeable filtrate spacer layers and around a port selected from the group consisting of at least one inlet feed port and at least one permeate port in a pattern which effects desired fluid flow through the layers,

providing a plurality of feed spacer layers,

forming a compressible polymeric composition to the feed spacer layers,

forming a stack of alternately positioned plurality of the feed permeable spacer layers, a plurality of filtrate spacer layers and a plurality of membrane filter layers;

compressing the stack,

melting the thermoplastic sections of the filtrate spacer layers while under compression to selectively seal the spacer layers in the at least one feed inlet port and the at least one permeate port such that liquid in said at least one permeate port is not admixed with liquid in the at least one feed port and to bond the membrane layers to the adjacent spacer layers, and

forming an outer portion of the module surrounding the stack by insert molding of a thermoplastic material.

23. (Previously presented) The process for forming a filtration module having at least one feed inlet port, at least one permeate port and at least one retentate port which comprises:

providing a plurality of fluid permeable filtrate spacer layers,

forming thermoplastic sections to the filtrate spacer layers about the periphery of each of the plurality of fluid permeable filtrate spacer layers and around a port selected from the group consisting of at least one inlet feed port, at least one permeate port and at least one retentate port in a pattern which effects desired fluid flow through the layers,,

providing a plurality of feed spacer layers,

forming a compressible polymeric composition to the feed spacer layers

forming a stack of alternately positioned plurality of the feed permeable spacer layers, a plurality of filtrate spacer layers and a plurality of membrane filter layers;

compressing the stack,

melting the thermoplastic sections of the filtrate spacer layers while under compression to selectively seal the spacer layers in the at least one feed inlet port, the at least one permeate port and at least one retentate port such that liquid in said at least one permeate port is not admixed with liquid in the at least one feed port and in the at least one retentate port and to bond the membrane layers to the adjacent spacer layers, and

forming an outer portion of the module surrounding the stack by insert molding of a thermoplastic material

wherein the device has a packing density of active membrane to external filter volume of at least 300 m^2/m^3.